

Strontium in Drinking Water

Strontium is a mineral that occurs naturally in the environment. Non-radioactive or "stable strontium" is very common in soil and bedrock and may dissolve entering groundwater. Radioactive strontium does not occur in nature and is usually associated with nuclear power plants or nuclear weapons testing. This fact sheet deals with the occurrence of stable strontium in drinking water.

How can I be exposed to strontium?

Strontium occurs nearly everywhere in small amounts. Air, dust, soil, foods and drinking water all contain traces of strontium. Ingestion of small amounts of strontium is not harmful. However, high levels of strontium can occur in water drawn from bedrock aquifers that are rich in strontium minerals.

How much strontium is safe in drinking water?

The US Environmental Protection Agency (EPA) has developed a lifetime health advisory of 4 mg/L for strontium levels in drinking water. Water that contains more than 4 mg strontium per liter should not be used for drinking water or to prepare beverages, food with water as a major ingredient or infant formula. It is safe to use this water for other purposes such as bathing, showering, and household chores.

How do I know if I have strontium in my water?

Strontium-contaminated water has no taste or odor. The only way to know if your drinking water has elevated levels of strontium is to have your water tested by a state-certified water testing laboratory. You can find a certified laboratory by searching the telephone directory under "Laboratories- Testing" or by searching the lab lists on the Department of Natural Resources website:
<http://dnr.wi.gov/org/es/science/lc/PW/Lablists.htm>.

To help you understand the results, you can contact your local health department (<http://dhs.wisconsin.gov/localhealth>) or call the Wisconsin Department of Health Services (DHS) at (608) 266-1120.

How can strontium affect my health?

While there is no evidence to suggest that ingestion of foods or beverages that naturally contain traces of strontium is harmful, exposure to high levels of strontium during infancy and childhood can affect bone growth and cause dental changes. Effects during adulthood are less well understood, but there is some evidence that strontium increases bone density.

Is strontium a concern for infants and young children?

Yes, infants and young children who ingest too much strontium can develop a condition called strontium rickets. Strontium rickets is a disease in which bones are thicker and shorter than normal and may be deformed. Deformities of the long bones in the legs, such as bow-leg and knockknee deformities, can cause lifelong problems with walking. A study conducted in Turkey found higher rates of one or more signs of rickets including thinning of the cranium, delayed closure of the fontanelles, beadlike growths at the ends of the ribs, conspicuous thickening of the wrists, and leg deformities in children who lived in a village with high levels of strontium in the soil. Breastfeeding for 24 months or longer was protective against these effects.

Are there federal standards for strontium in drinking water?

No. Because high levels of strontium in water are relatively rare, there is no federal drinking water standard at this time. However, the US EPA has set three health advisory levels for Strontium: a Lifetime Health Advisory Level (Lifetime HAL), a one-day Health Advisory Level (One-Day HAL), and at ten-day Health Advisory Level (10-Day HAL). HALs are not regulatory levels or legally enforceable standards. Rather, HALs serve as an estimate of acceptable levels in drinking water. They are used by Federal, State, and local officials when making decisions about the safety of the drinking water supply. The HALs for strontium are defined as:

4 mg/L	Lifetime HAL: A person who drinks water that contains the Lifetime HAL or lower of strontium for their entire lifetime would not be expected to develop any health problems related to strontium exposure.
25 mg/L	One-Day HAL: The level at which a child, drinking 1 liter of water in the course of one day, would not be expected to have any health problems related to strontium.
25 mg/L	Ten-Day HAL: The level at which a child, drinking 1 liter of water per day for ten days, would not be expected to have any health problems related to strontium.

How can I decrease my exposure to strontium in drinking water?

Its occurrence is not well known, so sampling and treatment for strontium are not required under the Safe Drinking Water Act. Work is underway to assess the extent of strontium occurrence in Wisconsin and to better understand its health effects in order to advise on needed actions.

If testing shows that the level of strontium in your water exceeds 4 mg/l, we recommend that you treat your water with a device known to reduce strontium levels or purchase bottled water for drinking and beverage preparation. Contact the Wisconsin Department of Safety and Professional Services at (608) 267-1401 to find out about water treatment options that are available for your home's water needs.

Public locations with individual wells (non-community wells), such as taverns, schools, and restaurants, must obtain approval from the Wisconsin DSPS before installing a water treatment system.

Where can I get more information?

For more information regarding strontium in well water:

- Wisconsin Division of Public Health, Bureau of Environmental and Occupational Health: (608) 266-1120 or <http://dhs.wisconsin.gov/eh>
- Wisconsin Local and Tribal Health Department: <http://dhs.wisconsin.gov/localhealth>

For information about treatment options:

- Wisconsin Department of Safety and Professional Services (DSPS): (608) 267-1401



Prepared by the
State of Wisconsin, Department of Health Services, Division of Public Health
with funds from the
Agency for Toxic Substances and Disease Registry
Public Health Service, U.S. Department of Health and Human Services
P-00292 (10/2011)